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The approximate latitudes at the times of observation were :—

1897 Dec. 22	31° 0′ N. Lat.	1898 Jan. 15	20° 45′ N. Lat.
23	31 0	Feb. 16	13 30
24	26 0	19	21 30
28	13 30	20	27 0
1898 Jan. 2	18 0	21	29 0

Mean areas and heliographic latitudes of Sun-spots in the year 1896, deduced from photographs taken at the Royal Observatory, Greenwich, at Dehra Dûn (India), and in Mauritius.

(*Communicated by the Astronomer Royal.*)

The results here given are in continuation of those printed in the *Monthly Notices*, vol. lviii. p. 40, and are deduced from the measurements of solar photographs taken at the Royal Observatory, Greenwich, at Dehra Dûn, India, and at the Royal Alfred Observatory, Mauritius.

Table I. gives the mean daily areas of umbræ, whole spots, and faculæ for each synodic rotation of the Sun in 1896; and Table II. gives the same particulars for the entire year 1896 and the seven preceding years for the sake of comparison. The areas are given in two forms. First, projected areas—that is to say, as seen and measured on the photographs, these being expressed in millionths of the Sun's apparent disc; and next, areas as corrected for foreshortening, the areas in this case being expressed in millionths of the Sun's visible hemisphere.

Table III. exhibits for each rotation in 1896 the mean daily area of whole spots, and the mean heliographic latitude of the spotted area for spots north and for spots south of the equator, together with the mean heliographic latitude of the entire spotted area, and the mean distance from the equator of all spots; and Table IV. gives the same information for the year as a whole, similar results from 1889 to 1895 being added, as in the case of Table II. Tables II. and IV. are thus in continuation of the similar tables for the years 1874 to 1888 on pp. 381 and 382 of vol. xlix. of the *Monthly Notices.*

The rotations in Table I. and Table III. are numbered in continuation of Carrington's series (*Observations of Solar Spots made at Redhill*, by R. C. Carrington, F.R.S.), No. 1 being the rotation commencing 1853 November 9. The assumed prime meridian is that which passed through the ascending node at mean noon on 1854 January 1, and the assumed period of the

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Sun's sidereal rotation is 25·38 days. The dates of the commencement of the rotations are given in Greenwich civil time, reckoning from mean midnight.

The principal features of the record for 1896 are :—

(1) The decrease in mean daily spotted area which began in 1894 has continued at an increasing rate.
(2) The decrease in the umbræ is also maintained. As compared with 1895 there is a diminution of 47 per cent.
(3) The faculæ which had shown a revival in 1895 have diminished, and are now less than in 1894.
(4) The decline in spots is far greater in the northern hemisphere than in the southern.
(5) Consequently, the predominance has passed back to the southern hemisphere.
(6) There has again been little change in the distribution of spots in heliographic latitude.
(7) No spots were seen on eight days during the year, and no faculæ on seven days.

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TABLE I.

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Photographs were taken.	Mean of Daily Areas.					
			Projected			Corrected for Foreshortening.		
			Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.
	d							
565	1895 Dec. 23·19	28	166	861	1606	114	631	1812
566	896 Jan. 19·53	26	82	464	841	66	378	966
567	Feb. 15·87	28	205	1413	1187	149	1022	1426
568	Mar. 14·20	26	130	829	1307	93	584	1556
569	Apr. 10·49	28	39	246	935	30	205	1175
570	May 7·73	27	74	433	827	51	301	938
571	June 3·95	27	191	1126	1014	133	783	1167
572	July 1·14	27	128	773	1407	93	576	1553
573	July 28·36	27	53	289	1124	37	209	1228
574	Aug. 24·58	27	273	1656	1703	187	1195	1879
575	Sept. 20·85	27	64	360	1394	48	290	1508
576	Oct. 18·14	28	219	1104	1438	151	794	1568
577	Nov. 14·44	27	93	494	1426	66	363	1603
578	Dec. 11·75	27	198	1130	1348	132	795	1551

TABLE II.

Year.	No. of Days on which Photographs were taken.	Mean of Daily Areas.					
		Projected			Corrected for Foreshortening.		
		Umbræ.	Whole Spots.	Faculæ.	Umbræ.	Whole Spots.	Faculæ.
1889	360	17·9	103	107	13·1	78·0	131
1890	361	21·3	133	273	15·5	99·4	304
1891	363	120	745	1322	86·2	569	1412
1892	362	255	1596	3230	186	1214	3270
1893	362	327	1983	2287	234	1464	2404
1894	364	317	1728	1666	231	1282	1877
1895	364	237	1330	2059	169	974	2278
1896	364	127	745	1243	90	543	1410

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TABLE III.

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Photographs were taken.	Spots North of the Equator. Mean of Daily Areas.	Spots North of the Equator. Mean Heliographic Latitude.	Spots South of the Equator. Mean of Daily Areas.	Spots South of the Equator. Mean Heliographic Latitude.	Mean Heliographic Latitude of Entire Spotted Area.	Mean Distance from Equator of all Spots.
	d.			°		°	°	°
565	1895 Dec. 23·19	28	171	13·54	460	12·93	− 5·74	13·09
566	1896 Jan. 19·53	26	99	11·93	278	15·44	− 8·24	14·52
567	Feb. 15·87	28	363	14·85	659	16·00	− 5·04	15·59
568	Mar. 14·20	26	433	15·79	151	15·40	+ 7·71	15·69
569	Apr. 10·49	28	129	15·09	76	13·36	+ 4·55	14·45
570	May 7·73	27	3	17·69	298	11·89	−11·63	11·94
571	June 3·95	27	137	19·56	646	16·94	−10·54	17·40
572	July 1·14	27	102	19·18	474	18·48	−11·80	18·60
573	July 28·36	27	43	12·93	166	17·44	−11·16	16·51
574	Aug. 24·58	27	835	12·99	359	13·53	+ 5·01	13·15
575	Sept. 20·85	27	89	11·59	201	11·98	− 4·74	11·86
576	Oct. 18·14	28	75	6·14	719	12·25	−10·51	11·67
577	Nov. 14·44	27	175	11·80	189	13·90	− 1·55	12·89
578	Dec. 11·75	27	167	6·14	628	9·28	− 6·03	8·62

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TABLE IV.

Year.	No. of Days on which Photographs were taken.	Spots North of the Equator.		Spots South of the Equator.		Mean Heliographic Latitude of Entire Spotted Area.	Mean Distance from Equator of all Spots.
		Mean of Daily Areas.	Mean Heliographic Latitude.	Mean of Daily Areas.	Mean Heliographic Latitude.		
1889	360	5·0	+ 7°·26	73·0	−11°·90	−10°·68	11°·61
1890	361	53·1	+22·20	46·3	−21·75	+ 1·73	21·99
1891	363	401	+20·49	169	−19·91	+ 8·52	20·31
1892	362	607	+15·09	607	−21·69	− 3·29	18·39
1893	360	517	+14·91	941	−14·26	− 3·93	14·49
1894	364	543	+12·31	739	−15·56	− 3·75	14·18
1895	364	565	+14·26	409	−12·54	+ 3·01	13·54
1896	364	203	+13·60	340	−14·77	− 4·15	14·33

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Notes on the Rotation Period of Venus. By E. M. Antoniadi.

(*Communicated by Capt. W. Noble.*)

The question of the rotation period of *Venus* is one to which the reply has eluded many a distinguished astronomer. Nor is the reason of the failures far to seek. The determination is in itself impossible by ordinary visual methods on account of the formidable diffusion of light by the planet's atmosphere, and until the day arrives when the Doppler-Fizeau principle can be successfully applied to the limb of *Venus*, we may justly display scepticism as to the value of current rotation periods.

The first attempt to determine the rotation period was made by Dominique Cassini in 1666–1667. Cassini considered the spots to be animated by a motion either of libration or rotation, having a period of less than 24 *hours*, round an axis almost coinciding with the plane of the planet's orbit.

Bianchini, who affirms that he had seen *Venus* rotate (1726–1728), fixed the rotation period as 24 *days* 8 *hours*. The axis, he considered, formed an angle of only 15° with the orbital plane.

Influenced by Jacques Cassini's ideas (as shown by Schiaparelli), the fanciful Schrœter found a period of 23 *hours* 20 *minutes* 59·04 *seconds*, while not less biassed must have been Fritsch, in giving, from *four* days' observation, the period as 23 *hours* 22 *minutes*.

Never did scientists, however, indulge more freely in illusions than when the Jesuits of the Roman College undertook, in 1839, under De Vico's direction, the determination of the planet's rotation period. Eleven thousand micrometrical measures of spots taken by Palomba, with unprecedented zeal, gave the value of $23^{h}\ 21^{m}\ 21^{s}.9345$.

The honour of demolishing these fanciful results belongs to Professor Schiaparelli, who, in a masterly discussion of all the observations,* concluded that "the rotation of $23^{h}\ 21^{m}$ or $23^{h}\ 22^{m}$ of Jacques Cassini, Schrœter and De Vico, is the result of a series of paralogisms and vicious circles."

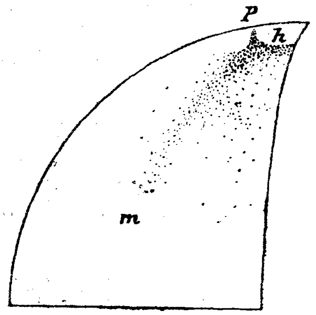

Fig. 1.

Taking as a base the immobility of some spots relatively to the terminator, the illustrious Director of the Milan Observatory

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* *L'Astronomie*, 1890.